



# **ENERGY STAR LABEL FOR BUILDINGS**

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# Energy Star For Buildings

## Five Criteria for Qualification

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- What is Energy Star for Buildings?
- Energy Star is a commercial program by the Environmental Protection Agency (EPA) to recognize and promote energy efficiency in commercial buildings.
- EPA provides awards for buildings which meet high energy performance standards.



## **Building to qualify for the Energy Star label. Must meet five criteria.**

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- Energy Efficiency (EUI)
- Adequate Ventilation (OA – CFM)
- Thermal Comfort (Temperature)
- Illumination (Foot Candles)
- Indoor Air Pollutants (Toxins, Mold)



# 1) Energy Efficiency

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- On a scale of 0 to 100, a building must be from 75-100 (energy efficiency) to qualify for the Energy Star Label when compared to other buildings of similar type and size.
- Buildings are “benchmarked” against other buildings.
- The Energy Usage Index (EUI) must be low. For Hawaii, it is about 16.5 kWh/sq.ft-year.



## 2) Adequate Ventilation

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- Outside air requirements for human comfort must met ASHRAE 62-1999.
- Office, ASHRAE 62-1999
- 20 CFM/Person



## 3) Thermal Comfort

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- The building comfort conditions must be met in accordance with ASHRAE Standard 55-1992.
- Dry bulb temperature range,
  - 68-78 Degrees Fahrenheit
- Relative Humidity
  - 30-60%



## 4) Illumination

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- Adequate lighting levels must be provided in accordance with Illuminance Engineering Society of North America (IESNA).
- Typical Office - Foot-candle Levels
- Horizontal                      Vertical
- 30-50                              5-10



## 5) Indoor Air Pollutants

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- The building must not show signs of any air pollutants (toxins) and be in accordance with ASHRAE 62-1999.
- Provide acceptable indoor air quality (IAQ).
- Control air pollutants through direct exhaust over specific areas like a copy room.
- Smoking Policy.
- Microbiological Sources (mold, mildew).



# Building Types and Square Footage

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- The Energy Star label can be applied to twelve different building types.
- All buildings must have a gross square footage of 5,000 square feet or more.



# Building Types

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- Offices (four types)
- Medical offices
- Dormitories/Residence Halls
- Warehouses (Refrigerated and Non-Refr)
- K-12 schools
- Supermarkets/Grocery Stores
- Hotels and Motels
- Acute Care/Children's Hospitals.



# Energy Star Certification

*(Conducting Energy Audits of SOH Facilities, I developed the following Checklist)*

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- Obtain current building plans both “as-built” and “renovations”.
- Obtain accurate conditioned square footage.
- Obtain accurate number and dimensions (SQ. Ft.) of other main areas including parking structures, data centers, etc.
- Obtain energy usage data from utility for at least 12 months.



# **Energy Star Certification Checklist**

## **(Continued)**

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- Obtain personnel occupant levels.
- Obtain occupancy hours (hours/week).
- Obtain information on office computer systems and miscellaneous equipment.
- Insert energy and occupant data into Energy Star Portfolio Manager.



# Conducting the Engineering Survey

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- **Mechanical** – Examine main cooling systems including chillers, pumps, cooling towers, etc.
- **Mechanical** – Examine air handler systems including motors and VFDs.
- **Mechanical** – ASHRAE 62-2001 - Examine and measure outside air entering building with the use of an anemometer or other device.



# Conducting the Engineering Survey

(continued)

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- **Thermal Comfort** – ASHRAE 52-1992 -  
Examine and measure temperature and humidity levels in selected areas representing “average conditions”.
- **Electrical – Lighting** – IESNA Standards –  
Examine and conduct foot candle measurements in selected areas representing average conditions.
- **Obtain appropriate forms at Portfolio Manager.**
- **PE to stamp appropriate forms and submit to EPA.**

# Energy Star Certification Sample Checklist

Space Description (offices, etc.)	Room (Number )	Direction (N,S,E,W)	People (#)	Computer (#)	Foot Candles		Temp (F)	Humidity (%)	S/A (CFM)	O/A (CFM)	Remark
					Horizontal	Vertical					
CU-101	101 A/B	N	5	5	65	25	74	52	2000	500	

Remarks/Comments



# Energy Star Compliance Field Work “Tools of the Trade”

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- **The following tools should be used to qualify buildings.**
- Digital Camera – Document the building and equipment.
- Ballast Checker. Identify Magnetic Ballasts (60 cycles/second).
- Flashlight.
- Humidity/Temperature Pen.
- Light Meter (Horizontal and Vertical Foot Candles).



## **“Tools of the Trade”**

### **(Continued)**

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- Anemometer (airflow, FPM).
- Laser Temperature Gun.
- Mirror Extension Device.
- Tape Measure.
- Rolo-tape (Building Exterior).
- Basic Tools (Screw driver, Pliers, etc).

# How to Evaluate Potential Energy Star Prospects – Check the EUI.



NO	SQ. FT.	Kwh/YEAR	\$/YEAR	EUI	CUI	comments	ES Score
1	119,000	4,431,600	\$505,809	37.2	\$4.25	Not likely for ES.	N/A
2	203,000	7,491,600	\$1,273,572	36.9	\$6.27	Not likely for ES.	N/A
3	31,702	955,440	\$104,700	30.1	\$3.30	Not likely for ES.	N/A
5	58,350	1,693,440	\$192,289	29.0	\$3.30	Not likely for ES.	N/A
11	284,593	6,228,000	\$1,079,737	21.9	\$3.79	Not likely for ES.	N/A
14	42,400	776,400	\$92,484	18.3	\$2.18	Not likely for ES.	N/A
15	53,360	909,280	\$114,799	17.0	\$2.15	Not likely for ES.	N/A
16	161,070	2,491,200	\$440,429	15.5	\$2.73	Possible Energy Star	78
17	26,374	405,840	\$74,945	15.4	\$2.84	Possible Energy Star	92
19	222,390	3,090,400	\$542,370	13.9	\$2.44	Re-Q for ES, in prog.	79



# State of Hawaii Energy Star Buildings

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## **1) State Office Tower - *Rating 79***

Located Downtown Honolulu – Office Tower

16 Story Building, 161,070 sq. ft., Built 1991, Small Parking Garage

EUI = 15.5 kWh/sq.ft-year, CUI = \$2.73/sq.ft-year

## **2) Kapolei Office Building – *Rating 78***

Located Kapolei – Office Building

5 Story Building, 191,040 sq. ft., Built 1998, Parking Lot and Data Center

EUI = 16.2 kWh/sq.ft-year, CUI = \$2.80/sq.ft-year

## **3) Abner Paki Hale Courthouse – *Rating 92***

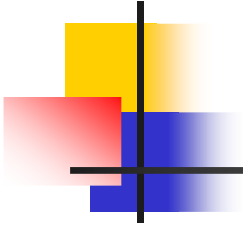
Located Kaneohe – New Courthouse

2 Story Building, 26,374 sq. ft., Built 2004, Small Parking Garage and Lot

EUI = 15.4 kWh/sq.ft-year, CUI = \$2.84/sq.ft-year

# Summary

## (Page 1)



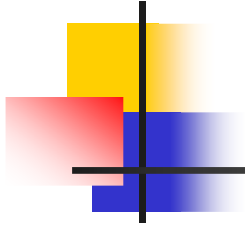
- Energy Star is an EPA program to recognize and promote energy efficiency in commercial buildings.
- Buildings must meet five important criteria,
  - Energy efficiency, ( $\sim 16.5$  kWh/sq.ft-year),
  - Ventilation (ASHRAE 62-1999),
  - Thermal comfort (ASHRAE 55-1992),
  - Indoor Air Pollutants (ASHRAE 62-1999),
  - Illumination Foot-Candles (IESNA Standards).



## Summary (Continued)

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- Many Buildings Can Qualify.
- Obtain Building Information.
  - Energy Usage Data, Square Footage, Building Plans.
- Conduct Engineering Survey
- Input data in Energy Star Portfolio.
- Obtain and fill out appropriate forms.
- Submit to EPA.



## Lessons Learned

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- Do your own research!
- Get accurate building square footage.
- Obtain additional information on parking structures and data centers.
- Develop a “systematic approach” to save time and energy.



## For More Information

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- Energy Star Website
- [www.energystar.gov](http://www.energystar.gov)
- Benchmarking of Commercial Buildings.
- <http://eber.ed.ornl.gov/commercialproducts/cbenchmk.htm>
- <http://www.hawaii.gov/dbedt/ert/rebuild/minutes/May03Presentations/Benchmarking.pdf>